(No Model.)

M. E. SULLIVAN.

TENSION MECHANISM FOR RING SPINNING MACHINES.

No. 535,029. Patented Mar. 5, 1895.

Fig. 1.

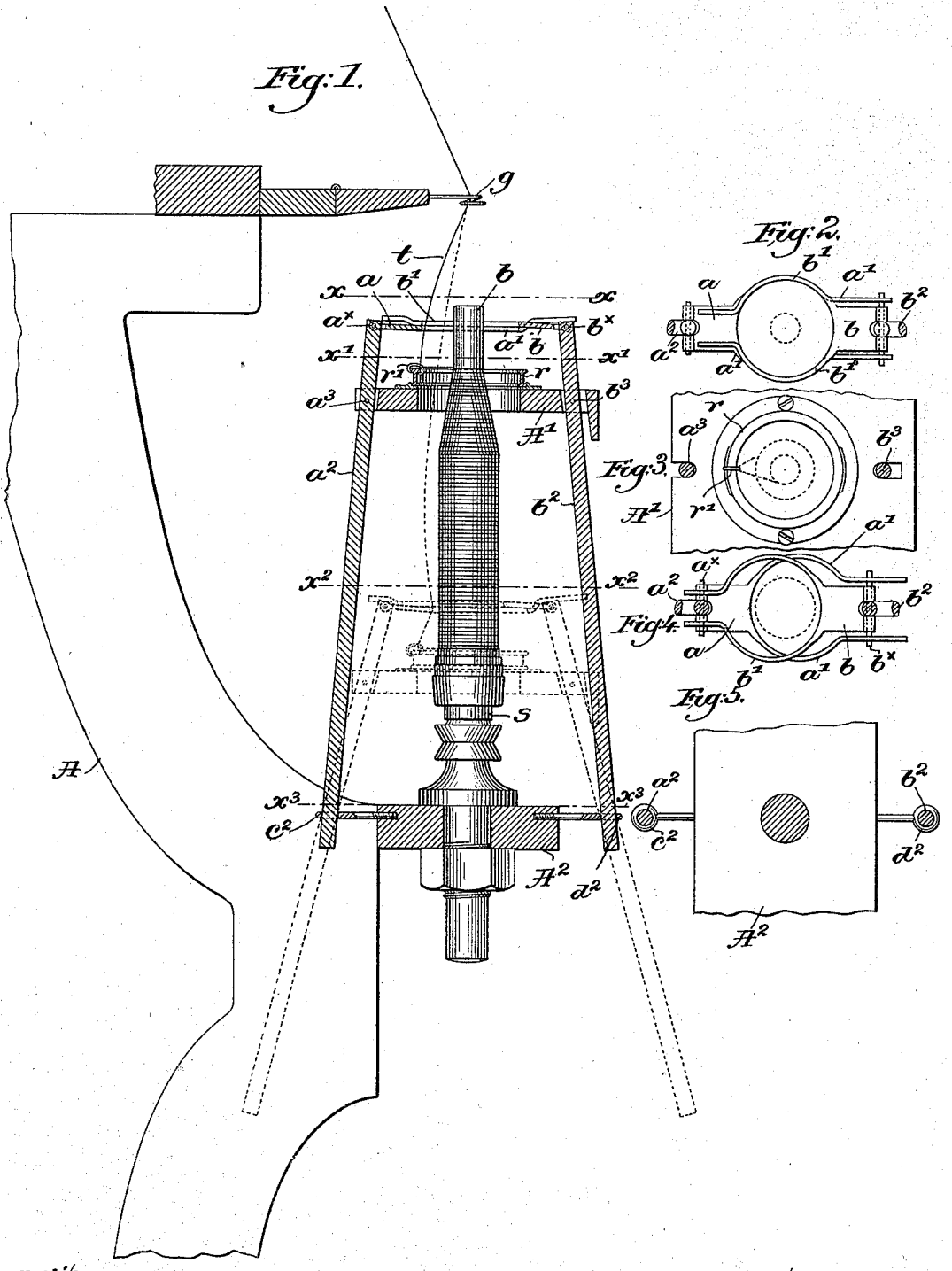

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Witnesses.
Edward F. Allen
Thomas J. Drummond

Inventor.
Michael E. Sullivan
by Crosby, Gregory. Attys.

UNITED STATES PATENT OFFICE.

MICHAEL E. SULLIVAN, OF NEW BEDFORD, MASSACHUSETTS, ASSIGNOR OF FIVE-EIGHTHS TO CHARLES S. RANDALL, ANDREW G. PIERCE, JR., AND JOHN W. CORNELL, OF SAME PLACE.

TENSION MECHANISM FOR RING-SPINNING MACHINES.

SPECIFICATION forming part of Letters Patent No. 535,029, dated March 5, 1895.

Application filed December 18, 1894. Serial No. 532,191. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL E. SULLIVAN, of New Bedford, county of Bristol, State of Massachusetts, have invented an Improvement in Tension Mechanism for Ring-Spinning Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In spinning threads and winding the same to what is known as the "weft wind," wherein the yarn starts from the bare bobbin and is wound therefrom diagonally and outwardly to the diameter of the ring on the rail, the yarn is subjected to greatly varying strains, owing to the differences in the angle assumed by the yarn between the bobbin and the point where it is held by the traveler running on the ordinary ring rail, the strain upon the yarn being the greatest when the yarn is nearest the bobbin, and gradually decreasing as the yarn reaches the outer portion of the yarn load.

In spinning, the traveler is usually gradually adjusted and proportioned to the travel of the yarn, and the traveler which will suit the yarn when at the bobbin will be too light when the yarn is going to the outer side of the yarn load, and it is to compensate and equalize this difference in strain that this invention has been devised.

I combine with the ring and traveler a tension mechanism consisting essentially of an expansible separator extended across the ring rail above the ring, to approach and recede from the center of rotation of the spindle carrying the bobbin, the yarn passing through the separator on its way to the traveler, and I have so mounted the separator that it is expanded as the ring rail rises, and contracted as the ring rail descends.

When the ring rail descends and the yarn is going away from the bare bobbin to the outer or larger part of the yarn load, the separator, which forms a tension device, is made to act against the yarn frictionally to produce tension thereon enough to equalize the greater freedom of slip of the traveler on the ring; and when the ring rail rises and the yarn is running to the bare bobbin, the strain on the yarn then being increased gradually to pull the traveler, the tension device is expanded so as to bear with less force upon the travel about the bobbin.

The expansible separator is curved or shaped to accommodate itself to the travel of the yarn as the same bows out between the yarn guide and the traveler.

In accordance therewith my invention consists, in a ring spinning frame, of the ring rail, and an expansible separator mounted thereon to act upon the travel of the yarn, combined with means to expand and contract the said separator as the ring rail rises and falls, respectively, whereby the tension upon the travel of the yarn is varied, substantially as will be described.

Other features of my invention will be hereinafter described and particularly pointed out in the claims.

Figure 1 in side elevation and partially in section represents a sufficient portion of a ring spinning frame to be understood with my invention applied thereto. Fig. 2 is a top or plan view of the expansible separator, taken below the line x—x, Fig. 1. Fig. 3 is a transverse section of Fig. 1 on the line x'—x'. Fig. 4 is a top or plan view of the separator when in the dotted line position shown in Fig. 1, below the line x^2—x^2, and Fig. 5 is a transverse section on the line x^3—x^3.

The frame A, ring rail A′, ring r and traveler r' thereon, the spindle rail A^2, spindle s, and the yarn guide g are and may be all as of usual and well known construction, the same forming no part of my invention.

The yarn t, passing through the yarn guide g and traveler r' to the bobbin b, bows out, as is well known, by the rapid movement of the traveler about the ring, during the spinning, and the travel of the yarn, *i. e.*, the bowed out portion, is acted upon frictionally by my invention, as will be described, to vary the tension in direct proportion to the freedom of slip of the traveler on the ring.

I have herein shown the tension mechanism as an expansible separator consisting essentially of two arms a, b, having at their inner sides fingers or branches a' and b' extended

toward each other, and pivotally mounted at $a^{\times}$ and $b^{\times}$, above the ring rail A′, on supports a^2, b^2, pivoted at a^3 and b^3 to the ring rail at opposite sides of the center of rotation of the spindle carrying the bobbin.

As shown in Figs. 2 and 4, the fingers a' and b' are oppositely curved, the preferably straight extremities of the fingers of one arm resting upon the other arm, or upon the extended ends of the pivotal support thereof, as at $b^{\times}$, the fingers forming an expansible separator, as will be described, within which the yarn travels between the yarn guide and the traveler.

The supports a^2, b^2, being pivoted to the ring rail A′ rise and fall therewith and maintain the separator at substantially the same height above the ring r throughout the movement. By rocking the supports on their pivots their upper ends will be moved toward and away from each other, to thereby move the arms a and b forward and backward across the ring rail, and I have herein shown simple means for causing such movement. The long depending ends of the rocking supports a^2 and b^2 are respectively passed through stationary guide eyes c^2, d^2 herein shown as secured to the spindle rail A^2, and farther apart than the pivots a^3, b^3 of the supports, so that when the ring rail descends the upper ends of the supports will be swung inward, or toward each other, as shown by dotted lines Fig. 1. At such times the yarn is going to the outer side of the yarn load on the bobbin, and the traveler r' has the greatest freedom of slip on the ring, but the arms a and b of the separator will be then nearest each other, contracting the path for the yarn travel, and acting against it with considerable friction, thus exerting tension thereupon to equalize the slip of the traveler on the ring.

Referring to Fig. 4, the separator is shown contracted, the arms and their fingers forming a confined space in which the yarn must move, the contraction of the yarn travel being very clearly shown by dotted lines Fig. 1. As the ring rail rises the arms a and b are gradually moved away from each other, expanding the separator, the strain upon the yarn due to the traveler increasing as the yarn nears the bobbin, while the tension, due to the separator, gradually diminishes until the parts are in the position indicated by full lines in Figs. 1 and 2. The yarn travel is then subjected to practically no tension by the separator, the area of the separator opening being substantially that of the circle described by the inner side of the traveler r', as will be seen by a comparison of Figs. 1, 2, and 3.

From the foregoing it will be evident that the yarn is subjected to a practically uniform strain throughout the movement of the ring rail, producing much more even and satisfactory bobbins, wound with uniform tension throughout.

While I have shown each arm of the separator as provided with two oppositely curved like fingers it will be obvious that one of the fingers on each arm might be shortened or altogether omitted, provided the other two fingers were oppositely curved and offered no obstruction upon which the yarn might catch.

My invention is not restricted to the exact construction of the expansible separator nor to the means herein shown for expanding and contracting it during the movement of the ring rail, and the same may be modified or changed without departing from the spirit and scope of my invention.

Though I have herein shown but one spindle and its co-operating ring and traveler and separator, it is obvious that there will be a separator for each spindle, and they may be operated simultaneously by independent or dependent mechanism.

I claim—

1. In a ring spinning frame, a ring rail, and an expansible separator mounted thereon to act upon the travel of the yarn, combined with means to expand and contract the said separator as the ring rail rises and falls, respectively, whereby the tension upon the travel of the yarn is varied, substantially as described.

2. In a ring spinning frame, a ring rail, a ring and traveler, and an expansible separator mounted upon said rail above the ring, combined with means to expand and contract the separator, to vary the tension upon the travel of the yarn as the drag of the traveler increases or decreases, substantially as described.

3. In a ring spinning frame, a ring rail, rocking supports mounted thereon, and an arm pivoted to each above the rail and provided with oppositely curved fingers extended toward each other, to form an expansible separator, combined with means to rock said supports and move the arms toward or from each other, to contract or expand the separator and thereby vary the tension exerted by it upon the yarn travel, substantially as described.

4. A ring rail, a series of rings and travelers, and an expansible separator above each ring to act upon the yarn, combined with means to expand or contract the separators and vary the tension exerted thereby on the yarn travel during the winding operation, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MICHAEL E. SULLIVAN.

Witnesses:
JAMES L. GILLINGHAM,
JOHN W. CORNELL.